

(19) Japan Patent Agency

Public Patent bulletin

(11) Patent Opening Number Sho 49 - 75652
(43) Date of being Public Sho 49 (1974) 22nd July
(21) Patent Application Number 47 - 116060
(22) Date of Patent Application Sho 47 (1972) 17th
November

Investigation of claims Nil

(Total 3 Pages (Japanese))

Internal Arrangement Number	(52) Japanese
	Classification
6660 48	25 (1) A 242
6342 48	25 (1) C 311, 1
6342 48	25 (1) <u>C</u> 318, 11

Public Patent Application

Sho 47 (1972) 17th November

Chief of the Patent Office Mio Yoshio

1. Title of the Invention Thermoplastic Resin
 Coloring Method.

2. Inventor

Address Oosaka shi, Matsuhara
 shi, Matsugahama, 8 -
 10 - 22.

Name Sugiyama Kazusa

(1 more names)

3. Patent Applicant

Mail number 535

Address Oosaka shi, Asahi ku,
 ---, 2 cho me 7 ban 16
 go.

Name Orient Kagaku Kogyo
 Kabushiki Kaisha

(Orient Chemical
Industries Ltd.)

Representative

Takahashi Juni

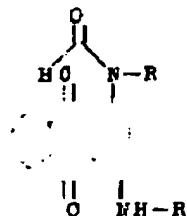
A Detailed Explanation

1. Title of the Invention

Thermoplastic Resin Coloring Method.

2. Scope of patent claims

The thermoplastic resin coloring method has the characteristic of coloring the thermoplastic resin by the dye shown by the general formula given below.



(Wherein, R present on the 4 - position and N are the

same and show alkyl radical excluding methyl radical, cyclo alkyl radical or alalkyl radical.)

3. Detailed description of the invention

The present invention relates to the coloration of thermoplastic resin. Synthetic thermoplastic resins such as polystyrene, poly methyl methacrylate, poly vinyl chloride, vinylidene chloride polymer and copolymer, polyethylene, polypropylene, styrene copolymer (AB), acrylonitrile butadiene styrene copolymer (ABS) etc. have high industrial value from which products are obtained by injection molding, extrusion process etc. by applying pressure and in many cases, these are colored.

However, the conditions used in the process of these thermoplastic resins are comparatively high processing temperature ($180 \sim 300^{\circ}\text{C}$), which are very severe for dye and pigment due to which these get faded and cannot be used. Furthermore, mutual reaction between other special additive used with colorant, polymerization catalyst,

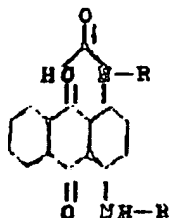
antioxidant, preservative, antiseptic, filler and resin has to be taking into consideration and colorant having resistance against the severe processing conditions is required. Moreover, demand for a colorant that does not any effect on the properties, that has satisfactory dispersion property, that has excellent coloring property and is cheap in cost, that is not sublimable, that has chemical resistance is increasing.

Inorganic pigment such as carbon black, iron oxide and other similar compounds are also used for coloring the thermoplastic resin, however, these have low coloring property and poor distinctness, particularly, transparent coloration product is very inconvenient. Organic pigments generally have poor heat resistance and weather resistance. High grade product having excellent heat resistance and weather resistance obtained by introducing multicyclic structure are being marketed presently, but these are expensive and these are not

convenient in case of requiring transparent color.

The present invention offers a colored synthetic thermoplastic resin composite colored in red color. This colored resin does not get discolored during the molding process of high temperature (for example, approximately 300°C) and moreover, it is resistant against light. The present invention is suitable to be used for coloring synthetic thermoplastic resin requiring transparency for example monomer such as polystyrene, AS, ABS, poly methyl methacrylate resin etc., copolymer, graft polymer and their copolymer with other substances. Moreover, the resin can contain additives such as ultraviolet rays absorption agent, antioxidant etc.

The present invention has the characteristic of coloring the thermoplastic resin by the compound shown by the general formula given below.



(Wherein, R present on 4 - position and N are the same and show alkyl radical excluding methyl radical, cyclo alkyl radical or alalkyl radical.)

As regards the alkyl radical shown by R, ethyl radical, n - propyl radical, iso - propyl radical, n - butyl radical, iso - butyl radical, sec - butyl radical, n - amyl radical, iso - amyl radical, sec - amyl radical, t - amyl radical, cyclo alkyl radical such as cyclo hexyl radical etc., alalkyl radical such as benzyl radical etc. can be given.

This compound is excellent colorant of thermoplastic resin and it was shown that it colors in the color tone from yellow (?) that is a fluorescent color to red and blue. The colorant has excellent sublimation resistance, heat resistance and weather resistance and it is completely stable in the presence of additives such as peroxide even

at high temperature of injection molding, extrusion process etc. Moreover, these do not undergo discoloration even in the case of monomer or mixture of thermoplastic resins or other resins, or during the processes performed under high temperature, pressure conditions. Furthermore, this special colorant when used with monomer such as methyl methacrylate does not show --- effect and is completely --- in polymerization. Moreover, it easily disperses and dissolves in the thermoplastic resin and has excellent coloration strength and distinctness and moreover, has color concentration due to which it meets the requirement of colorant that greatly reduces cost.

Mixing of colorant with the resin can be carried out by common well-known methods, for example, pellet or powder of resin is completely mixed with the colorant that is pulverized in a suitable mixer and it is kneaded in a screw extruder, screw inline type injection molding machine etc. based on which color molding is performed. Or the colorant

is dissolved in a monomer containing suitable polymerization catalyst and it is polymerized by heating based on which desired thermoplastic resin is formed.

The addition quantity of colorant differs with concentration of color, desired color, type of resin, however, it should be within the range from 0.01 ~ 5 %.

The colored molded material thus obtained is transparent fluorescent red colored product and is it resistant to heat. Moreover, black color etc. can be used. At this time also, other red colored colorant can be used based on which lustrous colored molded material can be obtained.

The present invention has been explained below in further details with the help of practical examples.

Practical example I

0.25 parts of powdered 4 - cyclo hexyl amino - 1, 9 - N - cyclo hexyl anthrapyridone was added to 500 parts of polystyrene pellet and it was mechanically mixed after

which it was supplied to screw - inline type injection molding machine heated at 180°C and it was injected in the mold of 5 x 9 x 0.3 cm³ when fluorescent vivacious red colored molded plate was obtained.

Practical example II

0.25 parts of powdered 4 - cyclo hexyl amino - 1, 9 - N - cyclo hexyl anthrapyridone was added to 500 parts of ABS resin powder and it was mechanically mixed after which it was supplied to screw - inline type injection molding machine heated at 230°C and it was injected in the mold of 5 x 9 x 0.3 cm³ when fluorescent vivacious red colored molded plate was obtained.

Moreover, no change in color was observed in the colored molded plate even by keeping it in the molding machine at 280°C for 30 minutes.

Practical example III

0.25 parts of powdered 4 - n - butyl amino - 1, 9 - n - butyl anthrapyridone was added to 500 parts of

polystyrene pellet and 1 g of titan white was added. Other than this change, operation similar to practical example I was carried out when fluorescent vivacious red colored molded plate was obtained.

Same results were obtained by using 4 - iso - propyl amino anthrapyridone instead of 4 - n - butyl amino - 1, 9 - n - butyl anthrapyridone.

Patent applicant	Orient Kagaku Kogyo
	Kabushiki Kaisha
	(Orient Chemical
	Industries Ltd.)
Representative	Takahashi Juni

4. List of attached documents

(1) A detailed description of the invention 1 copy

5. Inventors other than those mentioned above

Address	Oosaka shi, Higashi ku, Furushi,
	Otsu, 3 cho me, 6 ban chi. Japan

Housing 16 - 110

Name

Kitamura Hiroshi